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MISCELLANEOUS RECORDS OF INSECTS INHABITING THE SALINE WATERS OF THE CALIFORNIAN DESERT REGIONS

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The insect fauna of brackish waters of the western United States of America is a subject which has attracted the attention of entomologists since the observations made by A. S. Packard in 1869. Since that time much new information has been placed on record, mostly in the form of brief notes scattered throughout a variety of natural history journals. Many of these observations are of little scientific value in that no exact data as to the composition of the water are given. To say that the water is "brackish" or "salt" is so vague as to be practically meaningless. In the case of pelagic forms occurring in large bodies of water, such as Great Salt Lake, this lack of data is of no great significance, since the salinity is generally fairly constant and uniform, but in the smaller lakes which are fed by intermittent streams or springs, and which are liable to become very much more concentrated during the dry summer months, it is important to obtain exact data as to the salinity of the medium at the actual spot where the insects are collected. In such lakes one frequently finds very great variation in density within quite short distances and there may be very marked differences between the surface and the bottom layers. Moreover, pools which appear closely similar may differ enormously in salt content. It follows, therefore, that unless great care is taken the observations may be quite misleading.

The following notes were made, as opportunity offered, during various expeditions into the desert regions of California during 1928 and 1929. The observations are unfortunately very disconnected and incomplete, but as they are accompanied in most cases by exact data as to the environmental conditions

the writer feels that they are worth putting on record. Owing to the inaccessibility of many of the localities, details as to the life history and the degree of salinity which the various developmental stages are capable of withstanding are not known and will probably remain unknown for a long time to come. Such information, combined with a knowledge of the salinity variations throughout the year, would, however, be of the greatest interest for the work of Poisson (1924) and others, and has shown that a density which is quite harmless to an adult insect or to a late stage larva may, nevertheless, be sufficient to destroy the eggs or young larvæ, perhaps by interference with the hatching mechanism. Were such details known the reasons for the apparently capricious distribution of many of these halophilus insects would doubtless be more obvious.

It is to be hoped that others will follow up this line of work. A collector with more time at his disposal would not only be able to add to our knowledge in the ways outlined above, but would probably extend considerably the list of species from an area such as Death Valley. Owing to the great variations in the physical and chemical conditions a species may be very abundant in one spot, where conditions are at the optimum, and yet be nonexistent elsewhere, consequently even in a small area a great deal of collecting is needed before one's list is complete.

Death Valley Region.—A brief trip to the Death Valley region of California (Inyo County) was made during February 23-27, 1929. The south end of the valley was first visited. Where the bed of the Amargosa River was crossed no water was seen, but at camp near Old Confidence Mill biting midges were very troublesome, *Culicoides varipennis* Coq., and *Leptoconops kerteszi* var. *americanus* Carter, being taken. Various species of the genus *Culicoides* are known from salt and brackish waters in many parts of the world, and the species above referred to had no doubt bred in the highly saline temporary pools which represent the Amargosa River. *C. varipennis* is already known as a common fresh-water breeder in California and New Mexico, and *L. kerteszi* also breeds in fresh water in north and central California, as well as at Great Salt Lake, Utah.

Some collecting was done at Salt Creek and McLean Springs, on the valley floor, about two miles southwest of

Stovepipe Wells, on the 25th of February. A trickle of water running over the alkali caked mud at Salt Creek yielded the following results:

Coleoptera:
Dytiscidæ. *Hydroporus panaminti* Fall; *Hydroporus* spp. (larvæ of two species).
Hydrophilidæ. *Octhebius rectus* Lec.; *Enochrus diffusus* Lec.
Diptera:
Chironomidæ. *Orthocladius* sp. (larvæ and adults).

Two still pools at McLean Springs, "a" and "b," about eighteen inches deep and three feet in diameter, were also examined. The first contained the unidentifiable remains of a dragon fly larva, and at its margin the salt marsh Carabid, *Tachys vittiger,* was obtained. Pool "b" gave further specimens of *H. panaminti* and some empty caddis cases (Limnophilidæ), and in a very small pool near by *O. rectus* was again taken.

Further south collections were made in shallow pools connected with a slow-flowing stream on the east side of the valley floor, about one and a half miles north of Old Harmony Borax Mill. Here *H. panaminti* was again found, together with two species of *Hydroporous* in the larval stage. Besides *O. rectus* and a larva referable to it, larvæ of *Ephydra* sp. (*hians* ?) were present in considerable numbers.

Hurried collections made in a less concentrated pool at Eagle Borax Well yielded another Hydrophilid, *Tropisternus californicus* Lec., and larvae of a species of *Procladius.*

The salinity of these various waters, in parts per million, is given below:

	Salt Creek	McLean Springs "a"	McLean Springs "b"	Pools Near Old Harmony Mill	Eagle Borax Well
Cl	7,228	2,378	2,840	11,863	412
CO_3	48	0	0	0	0
HCO_3	50	537	500	850	135
SO_4	3,272	1,610	1,710	3,766	597
Ca	112	100	92	84	128
Mg	78	53	30	27	61
Na	6,200	2,300	2,737	9,010	345
Borax	60	20	40	300	10
Total	17,048	6,998	7,949	25,900	1,688
Sp. gr.	1.016	1.006	1.007	1.024	1.001

Owens Lake.—A visit was paid to Owens Lake, Inyo County, California, on July 7, 1928. The lake at this time was very low and on the western side, where the collecting was done, it was impossible to reach water more than half an inch in depth, overlying a slimy mud, which was swarming with Dipterous larvæ and pupæ, nothing else being found. There were great numbers of *Ephydra hians* Say, a species already recorded from this locality by Aldrich (1912). Pupal cases of a large *Tabanus* and many larvæ and pupæ of *Odontomyia* were found. The first named belonged to *T. punctifer* O. S., a common inhabitant of alkaline waters in the West (Webb and Wells), adults of which were caught in the near vicinity, and the latter are probably referable to *O. tumida* Banks, and *O. arcuata* Loew., both of which were obtained. No exact chemical and physical details of the environment of the latter two species appear to be on record. Brues (1928) records *T. punctifer* as occurring in waters with a specific gravity up to 1.014.

The composition of Owens Lake is already well known. According to Clarke (1924), the total salinity varies from 15,900 parts per million (specific gravity 1.015) to 213,700 parts per million (specific gravity 1.153). Considering the time of the year and the level of the lake, the insects obtained must have been living under conditions of salinity approaching those indicated by the higher figures.

The percentages of the chief constituents in the more saline samples are given below. The data have been calculated in parts per million, and are given in the second column so that the figures are comparable with those given in the other tables:

	Percentage of Total Salinity	p. p. m.
Cl	24.82	53,425
CO_3	24.55	52,463
SO_4	9.93	21,220
Na	38.09	81,398
K	1.62	3,461
Specific Gravity	1.153	

Mono Lake.—Owing to its greater depth and large size, Mono Lake is correspondingly more constant in composition. The following data are recalculated from Clarke:

Salinity	51,170 p. p. m.
Specific gravity	1.045
Cl	11,943 p. p. m.
CO_3	11,984
SO_4	6,580
Na	19,408
K	946

The only aquatic insect definitely known from Mono Lake appears to be *Ephydra hians* (Aldrich, 1913, and many other observers), and this was the only one found by the writer on a very brief visit in October 1928. Aldrich records *Tabanus opacus* Coq., and *T. phœnops* O. S., but it appears uncertain whether these were breeding actually in the lake or in streams running into it. *Ephydra subopaca* Loew., is also mentioned as occurring in seepage near the lake. Many other Diptera were recorded by Aldrich in the vicinity, but the breeding habits were not known.

Salton Sea.—This body of water is of particular interest in view of the great changes in salinity which must have taken place since its formation forty years ago. From 1891 till 1905 the lake was small and the salt content presumably high, although no data for that period appear to be available. From 1905-1907 fresh water from the Colorado River flowed in, with the result that the lake more than doubled its size. In 1911 the salinity was found to vary from 7164-7348 parts per million (MacDougal, 1914). After 1907 the inflow was checked, with the result that the salinity again began to increase and in 1913 had reached a salinity of 10,026 parts per million.

Hubbard in 1897 recorded four species of Coleoptera at a point near Salton where some springs, said to contain "1 to 6 per cent of saline matter," discharged into the sea. An undescribed species of *Creniphilus (Paracymus)* was described as present in vast numbers, with *Philhydrus diffusus* Lec.; and *Octhebius rectus* Lec., and a new species of the same genus were found less commonly. Hubbard also records an *Ephydra* different from that found in Great Salt Lake." Aldrich (1912) quotes a record of *E. gracilis* from this locality, but the specimens in my possession are all *E. subopaca,* not *gracilis.* Hubbard, in addition, records several salt marsh Staphylinids and Carabids.

I was, unfortunately, not able to reach the exact spot mentioned by Hubbard, but two visits to localities on the west shore of the lake failed to yield anything except immature Corixidæ, which could not be identified. All the specimens that I have from this particular region are two Ephydrids collected by Dr. E. A. Andrews, March 3, 1929, and very kindly handed over to me. They are *Ephydra subopaca,* and a *Paralimna* sp., but the latter can hardly have been breeding in the lake and there is some doubt about the *Ephydra.*

In contrast to the lack of insects in the Salton Sea, the insect fauna of a small tule-surrounded pool at Dos Palmas, a short way from the eastern shore of the lake, is of interest. This pool is fed by a luke-warm spring, an analysis of which is given below. Here, on December 12, 1928, larvæ of a species of Procladius were present in abundance, and larvæ of *Odontomyia* sp. were also found. Five species of Coleoptera were taken as follows:

Dytiscidæ. *Laccophilus mexicanus* Aubé; *Laccophilus terminalis* Sharp; *Rhantus binotatus* Harris.

Hydrophilidæ. *Tropisternus dorsalis* Brullé.

A few hundred yards away was a pool of fresh water containing abundant plant growth and mosquito larvæ, probably referable to *Anopheles pseudopunctipennis* Theob., and *Theoboldia inornata* Will., larvæ of *Odontomyia* sp. were also found. Here also occurred the Desert Minnow, *Cyprinodon macularcus.*

Analysis of springs at Dos Palmas:

	Dos Palmas	Canyon Springs
Cl	470	124
CO_3	0	0
HCO_3	115	155
SO_4	120	736
Ca	46	120
Mg	45	65
Na	270	230
Total Solids	1,020	1,388

A stagnant pool at Canyon Springs, about eight to ten miles away, contained nothing but mosquito larvæ, almost certainly those of *T. inornata,* a species already known from saline waters (Brues, 1928).

Discussion

Little need be said as to the composition of the waters, the tables will explain themselves. For the sake of comparison it may be said that the average specific gravity of sea water is 1.027, that of pure water, of course, being 1.000. It will thus be seen that many of the samples are much saltier than the sea, the most concentrated being that from Owens Lake, with a specific gravity 1.153. The waters are for the most part markedly alkaline, owing chiefly to the presence of large quantities of dissolved alkaline carbonates, and in some cases borax. It is, however, fairly well established that differences in p.H. of the medium have very little direct effect on aquatic insects, although, of course, the indirect effect by influencing the fauna and flora as a whole, may be very great. The high proportion of sulphates should also be noted.

In considering these waters as biological environments the most important point to know is, of course, the osmotic pressure. This cannot be measured in the field and, in the case of highly concentrated solutions, can only be estimated with some difficulty in the laboratory. In the case of sea water and brines produced by the evaporation of sea water, Fox (1926) has shown that no serious error is involved if it is assumed that the salts are completely ionized. Then the osmotic pressures can be taken as identical with those of solutions of pure NaCl of the same specific gravity, and for which the freezing point depressions are accurately known. This procedure is, of course, much less reliable in the case of waters such as are discussed in this paper, the salts of which are certainly not completely ionized, and figures obtained in this way will consequently tend to be too high; nevertheless, one or two examples, while only approximate, will serve to give some idea of the order of magnitude of this factor. Thus the osmotic pressure of Mono Lake would be about 50 atmospheres, that of the most concentrated of the Death Valley pools 28 atmospheres, whilst Owens Lake might reach as high as 175. The fact that the figures for Death Valley waters are so much lower than those for Owens Lake is probably due merely to the difference in the season at which the observations were made.

The observations here recorded supply further illustrations of the fact, already noted in many parts of the world (*e. g.*, Thorpe, 1927), that the Diptera are not only able to support life in media of an osmotic pressure that is rapidly fatal to most other insects, but that they have also a greater power of adaptation to changes in concentration than have other orders. As will be seen from these notes the waters of greatest salinity are occupied mainly by Dipterous larvæ, Coleopterous and Trichopterous larvæ occurring only at respectively lower concentrations.

Of the Ephydrids, *gracilis* and *hians* are well known as forms confined to saline waters. About *E. subopaca* there is some doubt. Aldrich says that in the West it is characteristic of the less dense waters (specific gravity 1.000 to 1.019), while Ping (1921), working in the East, states that it cannot go through its early stages in fresh water. The record from Salton appears to extend its known range in California by some five hundred miles to the south.[1]

Although unidentified Stratiomyidæ have frequently been recorded from saline and alkaline waters (Brues, 1928), the records from Owens Lake indicate a considerably higher salinity range than usual.

No exact data as to the habitat of any of the Coleoptera met with, excepting *T. dorsalis,* appear to have been recorded previously. *T. dorsalis* is recorded by Brues (1928) at specific gravity 1.0008 to 1.0015. With the possible exception of *H. panaminti,* the records suggest that all of these insects are also capable of developing in fresh water. The record of this species from Dos Palmas extends its known range south by two hundred miles. Dr. Fall tells me it was previously known only from the Death Valley region. It is seen to have a wide salinity range (specific gravity 1.001 to 1.024).

Finally I wish to express my indebtedness to Dr. H. C. Fall and Dr. O. A. Johannsen for determinations of the Coleoptera and Diptera respectively, and to the chemical department of the University of California Citrus Experiment Station at Riverside, for undertaking water analysis; to Mr. E. C. Jaeger of the Biology Department, Riverside Junior College, I am

[1] Unless E. millbræ, Jones, a common coast species in southern California, eventually proves to be identical.

much indebted, for without the advantage of his experience of desert travel some of the trips would not have been attempted.

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A NEW GYRINUS FROM ALASKA, WITH REFERENCES TO OTHER RECENTLY DESCRIBED SPECIES

(Coleoptera)

BY H. C. FALL

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Since the appearance of my paper on the "North American Species of Gyrinus" (Trans. Am. Ent. Soc., xlvii, 1916), three additional species have been described as follows: *G. hatchi* and *G. dubius* by Mr. J. B. Wallis (Can. Ent., April, 1926), and *G. gehringi* by Mr. K. F. Chamberlain (Bull. Brook. Ent. Soc., October, 1929).

G. hatchi Wallis. The type was collected by Mr. Melville H. Hatch at Crooked Lake, Washtenaw County, Michigan. It measures 4.69 mm. in length, color above black with bluish reflections, margins bronzed, elytra moderately polished but distinctly micropunctulate, beneath entirely rufotestaceous. It is perhaps nearest *fraternus,* but is smaller and with somewhat different male genitalia.

G. dubius Wallis. Type from St. Anthony, Newfoundland. According to Wallis, very close to *picipes* but more alutaceous and micropunctulate above with outer strial punctures less evidently larger than those near the suture.

G. gehringi Chamb. Type from Moose Pond, Pittsburg, in the Connecticut Lake region of New Hampshire. Said to most nearly resemble *lecontei,* but is uniformly rufotestaceous beneath and with quite different genitalia, the middle lobe being triangular, the sides nearly straight and rapidly converging to the sharply acuminate tip, which is strongly laterally compressed. Length, 5.5 to 6.2 mm.

G. piceolus Blatch. This species, founded on two female examples, was suppressed by me as insufficiently distinct from *pernitidus.* More recently Mr. Wallis (Can. Ent., February, 1926) has restored the species to specific standing on the basis of two males, one of which having been sent to Dr. Blatchley was declared by him to be identical with his type of *piceolus.* These males while "resembling *pernitidus* very closely" are said to show genitalic differences sufficient to warrant their being

given specific standing. Assuming the pale hypomera and epipleura to be characteristic, the species runs to *pleuralis* and *affinis* in my table, neither of which it at all resembles.

The following new Gyrinus from Alaska, recently received from Mr. R. E. Barrett of Saticoy, California, is another interesting addition to our fauna.

Gyrinus instabilis Fall, n. sp.

Nearly related to *wallisi* in form, color and most structural features, but of average smaller size.

Typical form. Moderately convex, black, two outer elytral interspaces more or less bronzed; disc of the elytra in the male with an obscure greenish reflection between striæ 4 and 7, faint but usually perceptible by oblique illumination; not definitely visible in the female; punctures not bronzed. Surface shining, the luster a little dulled in the female by an evident micropunctulation on a minutely alutaceous ground. In the male the alutaceous ground sculpture is scarcely if at all detectable and the micropunctulation is sparser and feebler, though always present. Striæ weakly impressed, the outer ones a little more noticeably so but not canaliculate; eleventh stria close to the margin; strial punctures slightly coarser externally. Body beneath, including the epipleura, metallic black. Front legs rufoferruginous; middle tibiæ, and hind tibiæ and tarsi flavotestaceous; middle tarsi except at base, and middle and hind femora more or less infuscate; claws piceous.

Male genitalia. Color piceous, the middle lobe paler basally; middle lobe nearly parallel-sided in fully apical half, at apex a little less than half the width of the lateral lobes; upper surface flattened for a considerable distance from the tip, which is broadly arcuato-truncate throughout its width.

Length, 4.75 to 5.6 mm.; width, 2.4 to 3.15 mm.

Variations. In a few examples the upper surface is entirely black without trace of metallic luster. In others the surface is polished, with the suture narrowly and the punctures bronzed. In these last the micropunctulation is nearly or quite wanting in the male but present in the female. The genital armature of the male is identically the same in these variants as in the typical form.

Described from a good series of specimens sent me by Mr. Barrett, who collected them all at Circle, Alaska, June 21, 1928. The type is a male in my own collection.

This species very much resembles *wallisi,* which, however, in series is a perceptibly larger species (5.2 to 6.8 mm.). The

total absence of æneous luster along the margins and in the punctures is much more frequent in *wallisi* than in the present species, and the æneous marginal stripe when present is as a rule narrower, more obscure and less definitely limited interiorly, but in a few examples it diffuses inwardly over the greater portion of the elytra. This condition does not obtain in any example of *instabilis*, in which the æneous marginal stripe is more definitely limited and seems never to cross the ninth stria. The obscure longitudinal deep greenish streak at the middle of each elytron in males of the typical form of *instabilis* (those without bronzed punctures) is faintly detectable in two similar males of *wallisi*.

In final analysis comparison shows that, while not greatly unlike, there are constant appreciable differences in the genitalia of these two species. In *wallisi* the middle lobe is slightly more slender, gradually tapering to the narrowly rounded apex, the upper surface flattened only at the immediate apex. The form in *instabilis* has been stated above.

Two Additions to Our Lists

I recently noticed among the Elaterids of the Snow collection at the University of Kansas two examples of the genus Cardiophorus, taken in the Baboquivari Mountains, Arizona, many years ago by Professor Snow and labelled *aptopoides* Cand., a species apparently not previously reported as having been taken north of Mexico. I submitted the specimens to W. S. Fisher of the National Museum, who confirmed the determination.

Among the Endomychidæ are two examples of *Epipocus subcostatus* Gorham, also taken in the Baboquivari Mountains, Arizona, by Professor Snow. The determination was made by Charles Liebeck and the specimens seem to agree perfectly with description in the Biologia.—Warwick Benedict, University of Kansas.

CHERMIDÆ FROM UTAH, NEVADA, AND ARIZONA, INCLUDING THREE NEW SPECIES

(Homoptera)

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(Continued from page 143)

Subfamily PSYLLINÆ

Genus PSYLLIA

1905, *Psyllia* Kirkaldy. Wien. Ent. Zeit., 24:268.

PSYLLIA BREVIATA Patch

Fig. 1, E. F

1912, *Psylla breviata* Patch. Maine Agr. Exp. Sta., Bull. 202:215.

Specimens. Two males from *Chrysothamnus speciosus* Nutt., St. George, Utah, May 1, 1930 (282); one female from *Salsola pestifer* A. Nels., St. George, Utah, May 17, 1930 (360); one female from the same host, Ely, Nevada, May 19, 1930 (2527); one female from *Pluchea sericea* (Nutt.), Glendale, Nevada, May 3, 1930 (338); one female from same host, Overton, Nevada, April 20, 1930 (235); one female from *Bassia hyssopifolia* (Pall.), Logandale, Nevada, May 2, 1930 (305); one female from *Covillea tridentata* (D. C.), St. Thomas, Nevada, May 18, 1930 (405); one male from the same host, Glendale, Nevada, May 3, 1930 (330); and one male from same host, St. George, Utah, May 1, 1930 (286).

The specimens at hand are referred to this species with considerable question. They are in agreement with the general characters of the species as given by Crawford except for the genitalia. For instance, the female genital segment in my specimens is approximately one-half the length of the rest of the abdomen, instead of being equal in length as stated by Crawford. This discrepancy may very well be a direct result of the method of measuring employed. It is a commonly observed fact in the long series of my material of this and other species that the genital segment of the female in unmounted or in dry mounted specimens will always appear to be proportionately longer than it actually is, due to the collapsing of the remainder of the abdomen. There is very little in common, furthermore, between the male genitalia as illustrated in Fig. 1, E, F, and the male genitalia of *Psylla breviata* Patch as drawn by Crawford. This discrepancy may, again, conceivably be assigned to a difference in interpretation by the technique here employed.

Observations with the higher magnifications of the microscope disclose the following structures not mentioned by Crawford. The fore wing is beset with rather large points at the distal end, these points becoming gradually less pronounced from the distal to the proximal end, while nowhere do they occur on the veins. Alar radulæ are sparsely developed as large points in the two marginal cells, between R_s and M_{1+2}, and between M_{3+4} and Cu. The posterior wings are relatively large and thick, the venation being conspicuous as a single row of points which appear somewhat larger than the similar points that rather densely beset the entire wing membrane.

Psyllia minuta Crawford
Fig. 2, O, P

1914, *Psylla minuta* Crawford. U. S. Nat. Mus., Bull. 85:142; figs.

Specimens. One male and six females from unknown host, Richfield, Utah, June 21, 1930 (no number); and one female from *Lepidium scopulorum* Jones, Garrison, Nevada, May 15, 1930 (2509).

The body and wings agree with the description by Crawford. The color notes given by him, however, are not applicable to my specimens. There is very little variation, the general color over the entire body is light brown. The extreme tip of the antennae and the apex of the female genital segment are black. The fore wings are fumate throughout with the apical half sometimes distinctly darker, the wing membrane is beset with numerous small points that decrease in size and conspicuousness from the distal to the proximal end. Four alar radulæ are present, one in each of the two marginal cells, one between R_s and M_1, and one between M_{3+4} and Cu_1. The posterior wing is delicately membraneous, punctate throughout, with the venation developed as faint ridges along which are rows of small points irregularly arranged.

The claspers of the male terminate at the apex in a distinctly anteriorly directed claw (Fig. 2, P). The female segment is scarcely half as long as the rest of the abdomen (Fig. 2, O), the ventral valve being hardly more than one-third the length of the dorsal valve, the apex of each bearing a number of very short, stout setæ, as illustrated.

THE GENUS XEROPHLŒA IN NORTH AMERICA
(Homoptera, Cicadellidæ)

BY PAUL B. LAWSON

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The genus Xerophlœa, erected by Germar in 1839, is one of the genera in the subfamily Gyponinæ. The members of the genus may be characterized as follows:

Medium sized or large leafhoppers, with ocelli on flattened vertex and closer to caudal than cephalic margin, vertex with margins acute; whole dorsal surface distinctly and coarsely pitted with pits bearing minute setæ; elytra more vertical than in *Gypona*. Color of females, except in a few cases, nearly uniformly green; males green or varying through yellowish to brown, with vertex and pronotum frequently marked with dark brown and veins of elytra frequently appearing mottled. In both sexes small dark spots occur on margins of veins in caudal half of elytra and sometimes over other parts of the body. Female ventral segment long, posterior margin bilobed, with narrow median slit extending nearly to base. Last ventral segment of male long, hiding valve; plates long and finger-like, extending to tip of pygofer.

The uniform coloration of the species and the very great similarity of the genitalia are undoubtedly responsible for the fact that hitherto but two species, *X. viridis* Fabricius and *X. major* Baker, have been recognized in the United States. Both the external and the internal genitalia are so similar in the species studied that, although they sometimes show small characteristic differences, it would be impossible to use them as diagnostic characters of certain value.

Through the kindness of Mr. E. P. Van Duzee, who has loaned us the material from the California Academy of Sciences and his own private collection, and through the collections of the past several summers in the south by Dr. R. H. Beamer of the University of Kansas and his survey party, a large number of specimens of the genus from California to Florida were made available for study. In addition, many specimens from northern states were available, so that the present study

[1] Contribution from the Department of Entomology, University of Kansas.

was made from ample material from nearly every part of the United States.

In spite of the fact that two of the chief characters used in taxonomic work with leafhoppers, namely color and genitalia, are of little or no value in this genus, it was soon found that the shape of the vertex and the degree of inflation of the front are very valuable and dependable characters. These, along with size and geographical distribution, were found to be sufficient to enable a proper differentiation of the several species. As a consequence eleven new species are here described, a number of which have undoubtedly been previously included in *X. viridis*.

Following is an artificial key for the separation of the species:

Key to Species

1. Front distinctly inflated 2
   Front at most but slightly inflated 6
2. Female with entire dorsal surface spotted with brown ..... *brunnea*, n. sp.
   Females uniformly green 3
3. Vertex of female at most about half length of pronotum 4
   Vertex of female distinctly more than half length of pronotum 5
4. Front very strongly inflated; vertex shorter ..... *inflata* n. sp.
   Front less strongly inflated; vertex longer ..... *robusta* n. sp.
5. Larger, more robust species, females over 6 mm ..... *vanduzeei* n. sp.
   Smaller, more slender species, females under 6 mm ..... *californica* n. sp.
6. Vertex broadly rounded ..... *major* Baker
   Vertex distinctly angulate 7
7. Males not at all greenish 8
   Males definitely greenish or yellowish green 9
8. Males robust, ashy gray, strikingly dotted with dark brown ..... *oraclis* n. sp.
   Males very slender, cream-colored, strongly marked with brown spots and lines ..... *tenuata* n. sp.
9. Larger species, females usually over 7 mm ..... *majesta* n. sp.
   Smaller species, females usually under 7 mm 10
10. Vertex of female nearly as long as pronotum 11
    Vertex of female distinctly shorter than pronotum 12
11. Vertex of female longer, sides straighter, apex more obtuse ..... *obtusa* n. sp.
    Vertex of female slightly shorter, sides more convex, apex more acute ..... *zionis* n. sp.

12. Species smaller, females under 6 mm.....*minor* n. sp.
Species larger, females 6-7.5 mm.....*viridis* (Fabr.)

Xerophlœa zionis Lawson, n. sp.

Figs. 11, 11a

Close to *X. viridis* but with longer vertex. Length, female, 6.5 to 7 mm.; male, 6 mm.

Head slightly narrower than prothorax; vertex one-third wider between the eyes than long, anterior margins distinctly convex, apex obtusely angulate; front slightly inflated. Pronotum one-fourth longer than vertex, anterior margin moderately convex.

Color: Females uniformly bright green above except for brownish eyes and ocelli; below more yellow, with tibiæ and tarsi bright green. Males yellowish green; vertex with median, longitudinal brown stripe; pronotum with posterior half and middle third of anterior half brownish.

Holotype, female, Zion National Park, Utah, August 13, 1929, Paul W. Oman. *Allotype,* male, same data, R. H. Beamer. *Paratypes,* a female, same data, Paul W. Oman; three females and a male, same data, R. H. Beamer; a female, Pine View, Utah, July 21, 1922, E. P. Van Duzee.

Last paratype in collection of California Academy of Sciences; all other types in Snow entomological collection.

Xerophlœa vanduzeei Lawson, n. sp.

Figs. 5, 5a

Close to *X. zionis* but with narrower head and front more definitely inflated. Length, female, 6 to 6.5 mm.; male, 5.5 mm.

Head distinctly narrower than prothorax; vertex one-third wider between the eyes than long, anterior margins nearly straight, apex obtusely but strongly angulate; front definitely inflated. Pronotum one-third longer than vertex, anterior margin strongly convex.

Color: Females uniformly bright green above except for brownish eyes and ocelli; yellowish green below. Males straw yellow or greenish yellow; median longitudinal line on vertex, posterior half and median third of anterior half of pronotum, small spots on veins and larger ones along claval suture, brown.

Holotype, female, and *allotype,* male, San Jacinto Mountains, California, July 21, 1929, R. H. Beamer. A large series of *paratypes,* taken largely by E. P. Van Duzee and R. H. Beamer, are at hand from the following localities in California: San Jacinto Mountains, Lemon Grove, San Diego County, Pittsburg, Niles Canyon, San Mateo, Lake Tahoe, Coachella

Valley, Mill Creek Canyon, Cazadero, San Francisco, Marin County, Cayton, Poso Creek, Selma, Potholes, Alameda County.

Twenty-four paratypes in collection of California Academy of Sciences; all other types in Snow entomological collection.

The writer is glad to name this species in honor of Mr. E. P. Van Duzee, through whose generous loan of material this study was made possible.

Xerophlœa obtusa Lawson, n. sp.

Figs. 8, 8a

Allied to *X. vanduzeei* but with longer and more obtusely pointed vertex. Length, female, 6.5 to 7 mm.

Head definitely narrower than pronotum; vertex four-fifths as long as width between eyes, margin very thin, apex broadly and obtusely rounded; front nearly straight. Pronotum slightly longer than vertex, anterior margin moderately convex.

Color: Yellowish green except for pink ocelli and brown eyes; elytral veins often with white spots. Underside more strongly yellow.

Holotype, female, San Jacinto Mountains, California, July 21, 1929. *Paratypes:* Orange County, California, July 14, 1929; San Jacinto Mountains, California, July 21, 1929; Laguna Mountains, California, July 6, 1929. All four type specimens taken by R. H. Beamer.

All types deposited in Snow entomological collection.

Xerophlœa minor Lawson, n. sp.

Figs. 6, 6a

A small robust species, allied to *viridis,* but stouter. Length, female, 5 to 6 mm.; male, 5 mm.

Head definitely narrower than pronotum; vertex about two-thirds as long as width between eyes, anterior margins nearly straight, apex obtusely angulate; front slightly but definitely inflated. Pronotum one-third longer than vertex.

Color: Females uniformly bright green above except for pink ocelli and brown eyes; underside more yellowish. Males usually yellowish green with usual brown line on vertex, disc and posterior half of pronotum and spots on claval suture, brown. Some specimens straw yellow, more strongly marked with brown on vertex, pronotum, scutellum, and spots on veins of elytra.

Holotype, female, Hidalgo County, Texas, July 31, 1928, R. H. Beamer. *Allotype,* male, Hidalgo County, Texas, July 28, 1928, R. H. Beamer. Paratypes, a large series from the

following localities: Cameron, Booie, Hidalgo, Harris, and Orange counties, Texas; Beaugard and Natchitoche counties, Louisiana; Biloxi, Agricultural College, Mississippi; Fort Pierce, Fruitville, Key Largo, Hilliard, Florida; Polk County, Arkansas.

Four paratypes deposited in collection of California Academy of Sciences; all other types in Snow entomological collection.

Xerophlœa californica Lawson, n. sp.

Figs. 3, 3a

Allied to *X. vanduzeei* but smaller, with front more strongly inflated and vertex relatively longer. Length, 5.5 to 6 mm.

Head very slightly narrower than pronotum; vertex about three-fourths as long as width between eyes, anterior margins slightly convex to obtusely angulate apex; front broadly and strongly inflated. Pronotum about one-third longer than vertex, anterior margin moderately convex.

Color: Varying from bright to yellowish green, often with small black dots all over surface; elytral veins sometimes spotted with brown.

Holotype, female, San Diego County, California, July 4, 1929, P. W. Oman. *Paratypes,* two same data; two others, San Jacinto Mountains, California, July 21, 1929, R. H. Beamer.

Types deposited in Snow entomological collection.[2]

Xerophlœa brunnea Lawson, n. sp.

Figs. 4, 4a

Allied to *X. californica,* but females are brown and vertex distinctly shorter. Length, female, 5.5 to 6 mm.

Head nearly as wide as pronotum; vertex very wide, about two-thirds as long as width between eyes, margins convex to obtuse apex; front strongly inflated. Pronotum about one-third longer than vertex.

Color: Dirty yellow, spotted all over with tiny brown dots, giving it a distinctly brownish appearance.

Holotype, female, and a *paratype,* Orange County, California, July 14, 1929, R. H. Beamer.

Types deposited in Snow entomological collection.

2 Note by the editor: The following additional specimens of this species were returned by Professor Lawson to the California Academy of Sciences labeled "Paratypes": Keen Camp, Riverside County, California, June 6, 1917 (Van Duzee); Alpine, San Diego County, California, October 4, 1913 (Van Duzee); same place, September 13, 1923 (Van Duzee); San Diego County, California, April 8, 1925 (Van Dyke), Selma, Fresno County, California, June 4, 1929 (Van Duzee).

This is the only species in the genus yet known in which the females depart entirely from the usual uniform green coloration and assume the color of some of the darker males.

Xerophlœa robusta Lawson, n. sp.

Figs. 2, 2a

A very stout species allied to *X. brunnea* but more robust and with front more strongly inflated. Length, female, 6 to 6.5 mm.; male, 5.5 mm.

Head distinctly narrower than pronotum; vertex nearly twice as wide between eyes as long, apex well rounded, very slightly, if at all, angulate, slightly upturned apically; front very strongly inflated. Pronotum nearly twice as long as vertex and very wide.

Color: Females uniformly bright green except for pink ocelli and brown eyes; males straw yellow with brown stripe on middle of vertex, disc and posterior half of pronotum and spots on suture of elytra, brown.

Holotype, female, Hidalgo County, Texas, July 28, 1928, R. H. Beamer. *Allotype,* male, Culberson County, Texas, July 12, 1927, L. D. Anderson. *Paratypes:* Chaves County, New Mexico; Hidalgo County, Texas; Nogales, Oracle, Patagonia, and Navajo and Yavapai counties, Arizona.

Six paratypes in collection of California Academy of Sciences; holotype, allotype, and six paratypes in Snow entomological collection.

Xerophlœa inflata Lawson, n. sp.

Figs. 1, 1a

Closely related to *X. robusta,* but with shorter vertex and even more inflated front. Length, female, 6 mm.; male, 5 mm.

Head distinctly narrower than pronotum; vertex fully twice as wide between eyes as long, anterior margin nearly rounded; front very strongly inflated. Pronotum fully twice as long as vertex, very wide.

Color: As in *X. robusta.*

Holotype, female, Brooks County, Texas, July 25, 1928, L. D. Anderson. *Allotype,* male, Tucson, Arizona, June 21, 1924, A. A. Nichol. *Paratypes:* Mescal, Tucson, Oracle, Huachuca, and Yavapai County, Arizona, and Palm Springs, California.

Four paratypes in collection of California Academy of Sciences; holotype, allotype, and four paratypes in Snow entomological collection.

Xerophlœa majesta Lawson, n. sp.

Figs. 9, 9a

Allied to *X. major* but not so robust and with angulate vertex. Length, female, 7 to 8 mm.; male, 6.5 to 7 mm.

Head distinctly narrower than pronotum; vertex nearly one-third wider between eyes than long, margins very thin, apex obtusely but distinctly angulate; front nearly straight. Pronotum distinctly longer than vertex, quite wide.

Color: Females uniformly bright green except for pink ocelli and brown eyes. Males straw yellow, usually well marked with brown on middle line of vertex, brown spots all over pronotum, and elytral veins alternating with white and brown spots.

Holotype, female, Douglas County, Kansas, trap light, July 10, 1930, Paul B. Lawson. *Allotype,* male, same data except taken on July 20. *Paratypes:* Douglas and Greenwood counties, Kansas; Hidalgo, Jim Wells, Palopinto, Bee, Kendall, Cameron, and Brooks counties, Austin and Galveston, Texas; Vicksburg, Mississippi; Clemson College, South Carolina.

Five paratypes in collection of California Academy of Sciences; holotype, allotype, and large series of paratypes in Snow entomological collection.

Xerophlœa oraclis Lawson, n. sp.

Figs. 10, 10a

Allied to *X. minor* but with more angulate vertex and more strongly marked with dark brown. Length, male, 5.25 mm.

Head distinctly narrower than pronotum; vertex nearly one-half wider between eyes than long, anterior margins straight, apex strongly angulate; front slightly inflated. Pronotum one-half longer than vertex, wide.

Color: Nearly ashy gray, strikingly marked with dark brown as follows: On middle third of vertex and scattered spots on lateral thirds, along anterior third to half of pronotum, and narrow band along posterior margin, two large spots on scutellum, many small spots on clavus, and particularly bordering elytral veins. Most of face brown and entire underside with many small brown dots.

Holotype, male, Oracle, Arizona, July 28, 1924, E. P. Van Duzee.

Type in collection of California Academy of Sciences.

Xerophlœa tenuata Lawson, n. sp.

Figs. 7, 7a

Perhaps closest to *X. viridis* but much more slender and vertex much longer. Length, male, 6 mm.

Head slightly narrower than pronotum; vertex nearly as wide between eyes as long, margins nearly straight to distinctly angulate apex; front straight. Pronotum but slightly longer than vertex.

Color: Background straw yellow to creamy yellow, heavily marked with brown. Vertex creamy yellow with three more or less distinct brown longitudinal stripes. Pronotum creamy yellow, irregularly irrorate with brown. Elytra straw yellow, with large brown spots on claval suture and veins strongly spotted with brown. Whole insect appearing strongly brown, above and below.

Holotype, male, San Diego County, California, October 17, 1913, E. P. Van Duzee.

Type in collection of California Academy of Sciences.

This species is by all odds the most slender member of the genus.

Xerophlœa viridis (Fabricius)

Figs. 12, 12a

Cercopis viridis Fabricius, Ent. Syst., iv, p. 50, 1794.
Xerophlœa grisea Germar, Zeits. f. Ent., i, p. 190, 1839.
Xerophlœa virescens Stål, Of. Vet. Akad. Forh., xi, p. 253, 1854.
Parapholis peltata Uhler, Bul. U. S. Geol. Geog. Surv., iii, p. 461, 1877.

A comparatively slender species. Length, female, 6.5 to 7.5 mm.; male, 5.5 to 6.5 mm.

Head slightly narrower than pronotum; vertex about three-fifths as long as width between the eyes, margins slightly convex to definitely angulate apex; front nearly straight. Pronotum at least one-half longer than vertex.

Color: Females light green, often with minute black dots, especially along elytral veins. Males yellowish green, usually with median line on vertex, disc and posterior half of pronotum, brown. In rare cases males are gray, with additional brown markings on vertex and pronotum and many brown spots on elytra, so that entire insect appears distinctly brown.

This species has been recorded from a number of states scattered over the whole area of the United States. In addition to those mentioned in Van Duzee's catalogue, the writer has before him specimens from Montana, Arizona, and New Mexico.

In the light of the distribution of the new species here described, there is some doubt in the writer's mind as to whether all the specimens called *viridis,* having as they do such a wide range of distribution, are really but one species. Moreover, there seem to be some differences in the vertex and front of specimens from various parts of the country. However, the

writer has not been able to differentiate clearly enough the specimens from the several regions, and thinks it best to put under this name all the forms here included. In distribution, therefore, this species may be said to cover the United States.

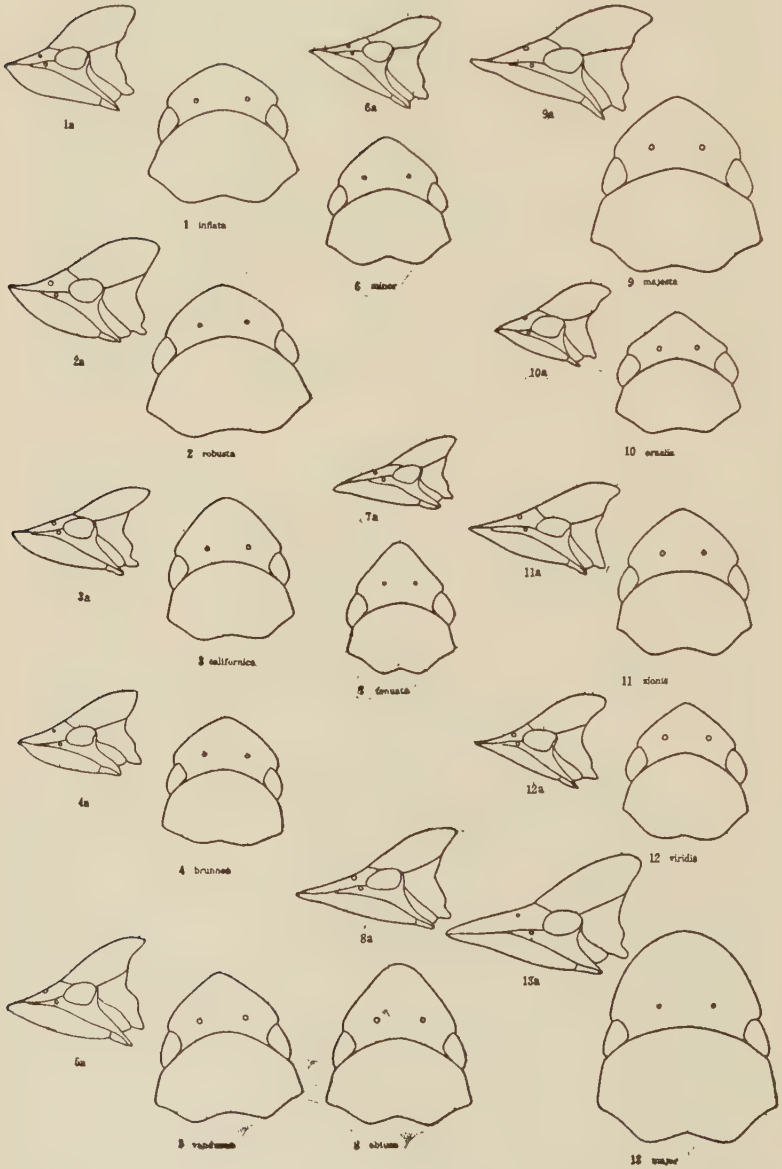
The original description of *X. viridis* does not set aside this species from many of the others, and the writer has not seen the type specimen. However, as now understood, the range of this species extends to the type locality, the original description fits it as well as any of the others, and commonly accepted usage would seem to make it advisable to continue the name for the forms described above. However, an examination of the type, if available, may show that this name is applied to the wrong species. In this case it is more than likely that the name *viridis* should apply to the species which the writer has named *minor*.

Germar undoubtedly had before him a male of this species when he described *grisea*, and Stål was most liable to have had a specimen of this, the commonest species, before him when he described *virescens*. Uhler described *peltata* from Colorado. This is undoubtedly a synonym for *viridis* because so far this is the only species recorded from that state.

Dr. Myron H. Swenk of the University of Nebraska recently told the writer that he had several records of the swarming in immense numbers of a species of Xerophlœa. He was kind enough to send the writer a number of specimens taken at the time of swarming, and these proved to be *viridis*. It is questionable whether anyone had ever before heard of any species of Xerophlœa occurring in anything like such tremendous numbers and, therefore, we are, through the courtesy of Dr. Swenk, quoting reports of a number of occasions when this species occurred in great swarms:

From Neligh *Leader* (Nebraska), October 1, 1920:

"The 11th day of September was unique in that the city of Neligh was visited by a cloud of the little green bugs, and windows other than mine were clouded with them and houses and stores were closed to shut them out. One of my friends set a small can under the electric light at the intersection of Main and Putney streets which was nearly filled by those which were killed and dropped. All the stores were closed and it was quite a chore next morning to sweep up the thousands that were caught when the stores were closed."


1a
1 inflata
6a
6 minor
9a
9 majesta
2a
2 robusta
10a
10 ornata
7a
7 fenusta
3a
3 californica
11a
11 rionis
4a
4 brunnea
12a
12 viridis
8a
8 obtusa
13a
13 vasper
5a
5 vandiemenensis

Mr. H. E. Zimmerman, O'Neill, Nebraska, wrote on September 17, 1920:

"Please find enclosed envelope containing portion of bugs which swarmed into our streets a few days ago. These pests swarmed in and formed about two inches thick all over the sidewalks on the west side of buildings. We are interested, as the farmers here are inquisitive."

Mr. John S. Marsh, Guide Rock, Nebraska, wrote on September 21, 1924:

"I am mailing you a sample of bugs that made their appearance last night. One could have swept up a bushel of them in buildings and on the sidewalks. What are they?"

It is evident from the above, that on occasion at least, this species must be considered as one of the more important leafhoppers.

Xerophlœa major Baker

Figs. 13, 13a

Xerophlœa major Baker, Psyche, viii, p. 285, 1898.

A large stout species with rounded vertex. Length, 7.5 to 8 mm.

Head slightly narrower than pronotum; vertex two-thirds to three-fourths as long as width between eyes, anterior margin broadly rounded; front in profile nearly straight. Pronotum but slightly longer than vertex.

Color: Female bright green, frequently well spotted with minute black dots.

This species is unique in its rounded vertex and general robustness. Van Duzee in his catalogue lists it from New York, New Jersey, Virginia, and Tennessee. The writer has before him a specimen from Cherokee County, Kansas.

The Odonata of China

Students of the Odonata will be interested in Dr. James G. Needham's Manual of the Dragonflies of China, published in Peiping as fasc. I of Vol. II of Zoölogica Sinica, Ser. A., issued October 1, 1930. Keys are given to the higher taxonomic units as well as to the genera and species, and adequate descriptions are given for all. Full accounts of the preparatory stages are included when they are known, and notes on distribution. A total of 89 genera and 266 species are treated in the 344 quarto pages and 20 plates. The work is entirely in the English language. Apparently the Odonata are a dominant group in China. —E. P. Van Duzee.

SYNONYMS IN THE NORTH AMERICAN THYSANOPTERA

BY J. DOUGLAS HOOD
University of Rochester

It has seemed desirable to clarify the records of this group of insects by eliminating certain synonyms. Three of these have been known to the writer for some years.

Genus Leucothrips Reuter

1904, *Leucothrips* Reuter, Medd. Soc. Fauna Flora Fenn., 30: 107. [Type, *L. nigripennis,* n. sp., by monotypy.]

1913, *Microthrips* Morgan, Proc. U. S. Nat. Mus., 46: 19. [Type, *M. piercei,* n. sp., by designation and monotypy.]

Body glabrous, without reticulation or close pubescence. Eyes prominent, strongly protruding, pilose. Antennæ seven-segmented, the last segment long, slender, about equal in length to sixth. Prothorax with two pairs of moderately long bristles at posterior angles. Fore wings long, slender, with a single longitudinal vein which bears a few bristles at base and one or more at apex. Abdominal bristles short and weak.

The affinities of this genus are with *Sericothrips, Scirtothrips,* and *Drepanothrips,* but from all of them it may easily be known by the seven-segmented antennæ and glabrous abdomen. Reuter described the antennæ as eight-segmented; but many years ago he sent me two specimens from his type series of *nigripennis,* mounted on small pieces of cardboard (as was his habit); and these have been compared with material from Belgium collected and determined by Bagnall. Reuter's misobservation was due to the dried condition of the material and its minute size, and led to the redescription of the genus by Morgan in 1913 as *Microthrips.*

Leucothrips nigripennis Reuter

1904, *Leucothrips nigripennis* Reuter, Medd. Soc. Fauna Flora Fenn., 30: 108 [Helsingfors, Finland, on ferns in greenhouse]. 1909, Bagnall, Ann. Soc. Ent. Belg., 53: 172 [Brussels, Belgium, on fern in greenhouse]. 1909, Bagnall, Journ. Econ. Biol., 4: 38 [Newcastle-on-Tyne, England, and Glasgow, Scotland, on ferns and other plants in greenhouses]. 1926, Pettit, 64th Ann. Rep. Secr. State Board Agr., State of Michigan, p. 219 [East Lansing, Mich., on fern in greenhouse]. 1926, Priesner, Thys. Eur., pp. 266, 718.[1]

[1] On this latter page Priesner says (translation): "According to Hood, in letter, this genus has 7- not 8-segmented antennæ. A fuller description must be reserved for some later time, as I am at present not in possession of actual specimens."

1927, *Microthrips leucus* Herrick, Ent. News, 38: 278. Fig. 2 [East Lansing, Michigan, on fern in greenhouse].

This species is represented in the material before me by cotypic material from Finland, sent to me twenty-two years ago by Reuter himself, by two specimens from Brussels, Belgium, taken in a greenhouse October 8, 1908, on *Duvallia*, by Bagnall, and two specimens from the series which furnished Mr. Herrick's types, taken on a fern in a greenhouse at East Lansing, Michigan, by Donald Ries and Miss E. I. McDaniel. One of these specimens is a cotype.

Herrick's specimens were studied by me in 1925 and 1926, at which times I told him that the species was *Leucothrips nigripennis*.

The insect, as will be seen from the citations given above, appears to be not rare in greenhouses in both the Old and New Worlds.

Thrips herricki Bagnall

1926, *Thrips herricki* Bagnall, Ann. and Mag. Nat. Hist., Ser. 9, 18: 545 [Ithaca, N. Y., June 27, 1924, G. W. Herrick, on *Veratrum viride*].

1927, *Thrips veratri* Priesner, in letters [Ithaca, N. Y., June 27, 1924, G. W. Herrick, on *Veratrum viride*].

1927, *Thrips veratri* Hood, Ent. Amer., 7: 218. Pl. XX, fig. 2 (June 14) [Ithaca, N. Y., June 27, 1924 (G. W. Herrick) and July, 1926 (J. D. H.), on *Veratrum viride*].

1927, *Thrips veratri* Herrick, Ent. News, 38: 276. Fig. 1 (October 31) [Ithaca, N. Y., June 27, 1924, G. W. Herrick, on *Veratrum viride*].

Mr. Herrick discovered this species at Ithaca, New York, on False Hellebore (*Veratrum viride* Ait.) and sent specimens for determination simultaneously to Bagnall, Priesner, and myself, each of whom, exercising the right of a specialist to publish the results of his studies, prepared descriptions for the press. Two of these descriptions actually appeared. Upon receiving the results of his poll, Mr. Herrick drew up a fourth description himself, and published it. No confusion has resulted from this wasted effort, however, three of the four authors, in naming the insect after the plant on which it was taken, having employed the same specific name!

Wherever its food plant occurs, in New York State at least, this much-described insect may usually be found in June and

July, feeding, often in abundance, on the broad leaves, usually in company with its nymphs.

Treherniella amplipennis (Morgan)

1913, *Trichothrips amplipennis* Morgan, Proc. U. S. Nat. Mus., 46: 33. Figs. 64-67. [Quincy, Florida, on *Hypericum dolabriforme*].

1919, *Haplothrips orlando* Watson and Osborn, Fla. Buggist, 2: 116. [Orlando, Florida, taken by sweeping shrubs in "flat woods."]

1923, *Treherniella orlando,* Watson, Fla. Agr. Exp. Sta. Bul., 168: 67, 81. [Designated as type of the new genus *Treherniella*].

The combination of generic and specific name given above is new. The following material has been studied in arriving at the above synonymy:

Florida: Quincy, May 15, 1910, on *Hypericum dolabriforme,* A. C. Morgan and G. A. Runner; 2 ♀♀ (2 slides), *paratypes of Trichothrips amplipennis.*

Gainesville, August 9, 1919, oak in "flat woods"; 1 ♂, *paratype* of *Haplothrips orlando.*

Las Palmas, Merritts I., May 4, 1924, sweeping, J. R. Watson; 1 ♂, determined by Watson as *Treherniella orlando.*

Tampa, February, 1924, T. H. Hubbell; 1 ♀, determined by Watson as *Treherniella orlando.*

Bradentown, January 20, 1919, sweeping, Alexander Wetmore; 5 ♀♀, 1 ♂.

Megalothrips picticornis Hood

1927, *Megalothrips picticornis* Hood, Proc. Biol. Soc. Wash., 40: 204 [Blue Lake, Calif., and Salt Lake City, Utah, on dead willow].

1929, *Docessissophothrips animus* Moulton, Bull. Brooklyn Ent. Soc., 24: 242 [Mt. View, Calif., and Corvallis, Ore.] 1931, Pan.-Pac. Ent., 7: 123 [Berkeley, Calif., in scolytid burrows in linden].

There can be little question as to the correctness of the above synonymy, though Moulton's specimens apparently lack the yellow band which I have described as occurring at the base of the fourth antennal segment. The species is thoroughly congeneric with the European *M. bonannii* Uzel (1895) and the Eastern North American *M. spinosus* Hood (1908), both of which have been fully described and figured. Like them, *picticornis* is perhaps most frequently found in hollow stems and in the burrows of various wood-boring beetles. Whether it is specifically distinct, or later will be found merely entitled to subspecific rank as a geographical race, further collecting no doubt will disclose.

AN INTERESTING NEW CALIFORNIA THRIPS

BY DUDLEY MOULTON

Mr. Richard S. Bagnall, in his interesting paper on the Classification of the Thysanoptera, (Ann. & Mag. Nat. Hist., Ser. 10, Vol. 5, p. 574, May, 1930), erects a new Superfamily, *Melanothripoidea*, for the Family *Melanothripidæ*, Bagnall. One of the characters included in this Superfamily is "Apex of fore tibia armed with a dagger-like scoop, or, if simple, antennal joint one or two so armed." Other characters of the included genera are three-jointed maxillary and two-jointed labial palpi, single or horseshoe-shaped sense area on each of third and fourth antennal segments and the absence of a tarsal hook.

The genus *Dactuliothrips* with a maxillary palpus of three and a labial palpus of two segments cannot be included in the Superfamily *Aeolothripoidea* Hood, Family *Orothripidæ* Bagnall, although it has many characters in common with this group. Also it cannot be included in the Family *Melanothripidæ* Bagnall, nor in the Superfamily *Melanothripoidea* Bagnall, as now recognized although the predominating characters would seem to place it in this superfamily. I am therefore erecting a new family, *Dactuliothripidæ*, and genus and placing them as follows:

Superfamily MELANOTHRIPOIDEA Bagnall
Family **Dactuliothripidæ** Moulton
Genus **Dactuliothrips** Moulton
(*Daktulios*—a ring)

Having the general appearance of an *Orothrips* or *Melanothrips*. Antennæ long and slender, with all segments freely movable and reduced gradually beyond the second. Segments three to nine each with nine to eleven distinct annulations or rings which are surrounded by whorls of setæ. Each of segments three and four with two circular to oblong sense areas near tip. Maxillary palpus with three segments and geniculate between second and third, labial palpus with two segments. Fore tibia unarmed, each fore tarsus with a distinct hook-like appendage. Wings fully developed, broadly rounded at tip, with ring vein, two longitudinal and four cross veins. Ovipositor curved upward.

The genus *Dactuliothrips* may be separated from *Orothrips* by the shape of the antennæ and the three-segmented maxillary

palpus and two-segmented labial palpus. It may be separated from *Melanothrips* by the presence of two circular sense areas on segments three and four and the presence of a tarsal hook-like appendage.

Dactuliothrips spinosus Moulton, n. sp.

Female holotype: Color uniformly brown to light brown with fore tibiæ and tarsi and third antennal segment yellowish. Wings uniformly light grayish brown, without darkened cross bands. Body and wing spines dark brown.

Total body length, 1.44 mm.; head, length .176 mm., width .205 mm.; prothorax, length .147 mm., width .235 mm.; mesothorax, width .32 mm.; abdomen, width .47 mm. Segments of antenna: length (width) I, 23 (36); II, 40 (30); III, 56 (23); IV, 66 (21); V, 63 (18); VI, 63 (17); VII, 50 (16); VIII, 46 (13); IX, 53 (10); total length of antenna 456 microns. Length of spines: interocellar 73 microns, postoculars, outer and inner, 80 microns, median dorsal on ninth abdominal segment 133 microns, on tenth segment 140 microns.

Head slightly longer than wide, depressed in front at base of antenna, cheeks slightly arched. Interocellar, postoculars, and other spines prominent. Eyes produced in front, ocelli fully developed. Mouth cone short. Antenna slender, 2.6 times longer than head.

Prothorax with numerous conspicuous spines, especially those at angles and margins. Legs with numerous conspicuous spines. Fore femora thickened and armed with a series of four short spurs on distal half of inner anterior margin. Fore tibia without armature except a pair of stout spines at tip. Wings with regularly placed spines on costa, sixteen on fore vein and thirteen on hind vein.

Abdomen broadly ovate with tergites transversely striate and more or less densely pubescent at the sides. Terminal segments small.

Male allotype: Smaller than female, body length .97 mm. Body, legs, and wings lighter in color than in female, but with all body, leg, and wing spines conspicuously prominent by their dark color. The single male specimen has an armature of only three spurs on inner distal half of each fore femora instead of four as in the female.

Type material: Female holotype, male allotype, six female paratypes taken on *Prunus demissa* (Choke-cherry), May 19, 1929 (G. R. Struble). All types in author's collection. (Moulton No. 3832.)

Type locality: Willow Ranch, Siskiyou County, California.

A THRIPS NEW TO CALIFORNIA

BY STANLEY F. BAILEY

University of California

On September 2, 1930, Mr. A. E. Michelbacher collected some very unusual thrips from the bark of a dying coast live oak (*Quercus agrifolia* Neé). The tree was situated on the southwest corner of the campus of the University of California, Berkeley, California. Specimens of this very interesting thrips sent to Mr. Dudley Moulton of San Francisco were determined as *Pœcilothrips ornatus* (Hood). He stated that this was the first record from California of this rather uncommon thrips.

This species was first described by J. D. Hood in 1913 as *Phlœothrips ornatus* from thirty-seven females taken in May and June on the bark of a dying red oak tree at Washington, D. C.

Hood stated that there were both winged and wingless forms and that they were practically identical save for the presence or absence of the wings. No mention was made of the male and apparently it never has been collected.

There seems to be no further mention of this species until 1927 when Hood transferred it to the genus *Pœcilothrips* and wrote "I have for some years suspected that my *Phlœothrips ornatus* might be congeneric, perhaps even conspecific, with Uzel's *Pœcilothrips albopictus*, described and still known only from the unique type taken in Bohemia. Dr. Priesner (in litt.) has suggested the same thing, but he has not yet been able to make a direct comparison."

At the same time Hood (1927) reported this species from New York and Pennsylvania. However, of all the collections made of this thrips in this country up to September, 1930, the total number of specimens was represented by forty adult females, one pupa and seven larvæ. The colony here recorded on a dying coast live oak in Berkeley was represented by several hundred larvæ and adults, both winged and wingless. Of 201 adult females collected on September 3, 1930, twenty-three, or 11.4 per cent, were winged. No males or pupæ were found. Large numbers of eggs, discernible as white specks, were to be found singly and in clusters on the surface and among the cracks of the bark. The long axis of the egg was in some cases

at right angles to the surface of the bark and in other cases parallel. The clusters of eggs exhibited no order of arrangement.

From careful observations made on this colony during the fall and winter it appeared that this species, like many of the suborder Tubulifera, were inhabitants of bark. My observations seem to be substantiated in that collections of this species were made in Washington, D. C., from the bark of a dying red oak, and that the specimens collected in Pennsylvania and New York were taken under the bark of hickory stumps (two females were taken flying). It was not definitely ascertained whether the thrips were feeding only on the exudate of the dying tree, which was issuing from the deeply cracked bark, or on fungi, although no fungi were visible under a hand lens. The adults and larvæ were found feeding together in scattered groups, both on the surface of the bark, and particularly on the freshly cracked portions of the trunk, from the surface of the ground to about five feet above. All forms present were very sluggish in their movements and did not even attempt to seek shelter under the loose bark when disturbed. Neither egg-laying, nor emergence of larvæ was observed, nor was the number of larval molts or the rate of egg laying determined. In association with the thrips were various spiders, many mites, ants, psocids, and collembolans. From all observations the mites present were not predacious on the thrips.

During September and October both young and mature larvæ were present, as well as a few winged adults. But as the season progressed the numbers fell off greatly and by early December only about ninety large larvæ and twenty-five wingless adults could be found. No eggs were found after the first of November. These remaining individuals had concentrated on the north side of the trunk, which was still exuding a small amount of sap. The bark on the opposite side of the tree had dried out and was shrinking away from the trunk. There was an unusually cold snap during the last of December and during this period the thrips crawled deep into the crevices of the bark and under portions that had pulled away from the trunk. All activity was at a minimum. Throughout the following month very little activity was evident and the numbers began to drop

off more noticeably until February 1, when only seven wingless adults could be found and only twenty-seven large larvæ. These surviving individuals were clustered on the north side of the tree about four inches from the ground on a moist section of bark partly protected by a clump of dead grass. From this it would seem that both mature larvæ and wingless adults wintered over and that there was a very great mortality under such conditions. No other thrips of this species have been found in the locality. On February 11 the tree was removed, as it was becoming unsightly and observations on the biology of this isolated colony were concluded.

Description of the Egg

The egg is quite delicate, oblong, rounded at both ends with the sides practically parallel. Average length 0.447 mm., average width 0.185 mm. Color snowy white due to a covering of waxy material over the entire surface. This waxy substance is laid down in regular hexagonal areas the average width of which is 0.026 mm. On the anterior end the wax is sometimes present in raised areas, giving the appearance of tubercles. Previous to hatching the yellowish tinge of the larva is visible under the wax and, with magnification, the reddish brown eye-spots are evident, as well as the legs and antennæ which are folded down on the ventral surface of the body. Upon hatching the anterior end of the chorion is apparently forcibly ruptured by the increased size of the mature embryo.

Description of the Larva

Newly emerged larva. Total length 0.537 mm. Abdomen ten-segmented, tapering; length 0.184 mm.; length of tube or tenth segment 0.066 mm.; ninth segment about one-half as long as tenth; remainder of segments shorter and about equal. Width of first abdominal segment 0.123 mm.; width of tenth segment at base 0.034 mm. Head very long in proportion to body, as are the antennæ and legs. Length of head 0.114 mm.; width 0.066 mm. Width of mesothorax, 0.127 mm. Antenna seven-segmented; length 0.211 mm. Length of antennal segments: I 0.022 mm., II 0.028 mm., III 0.039 mm., IV 0.035 mm., V 0.026 mm., VI 0.026 mm., VII 0.035 mm. First segment short, cylindrical; second, barrel-shaped; third, fourth, fifth and sixth segments narrower at base; seventh long, tapering. Color gray; anterior half of second segment very light, remainder of segments a uniform gray. The eyes are reddish brown and, in general, the color of the larva is pale yellow with a trace of crimson on the margins of the abdominal segments. No ocelli. Spines on head, thorax and abdomen branched at tip.

Full grown larva. The mature larva is very strikingly marked with crimson and white. There is considerable variation in the size

and position of the white areas but from a dorsal view the general appearance is as follows: head white with lateral margins and two longitudinal stripes in center crimson; prothorax white with two irregular areas of crimson in the center; mesothorax crimson, often with the lateral margins white; metathorax white. Abdomen: first and second segments crimson, often with circular area of white in center; third segment white; fourth crimson with an irregular white spot in center; fifth crimson; sixth white, often with anterior-lateral margins crimson; seventh, eighth and ninth crimson with large irregular spots of white in center; tenth reddish brown. Legs yellowish, tinged with crimson. Eyes dark reddish brown. Ocelli and genitalia not apparent. First three abdominal segments equal in width, the remainder tapering to the tube or last segment. Head slightly wider at base than below eyes. Spines on head and at posterior angles of thoracic and abdominal segments strong, branched at tip.

Total length 1.550 mm. Length of head 0.150 mm., abdomen 0.875 mm., tenth abdominal segment 0.075 mm., ninth slightly less than tenth. Width of head at base 0.139 mm., prothorax 0.328 mm., mesothorax 0.417 mm., metathorax 0.437 mm., first abdominal segment 0.398 mm., tenth abdominal segment at base 0.034 mm.

Length of antenna 0.288 mm. Length of antennal segments: I 0.019 mm., II 0.039 mm., III 0.069 mm., IV 0.049 mm., V 0.039 mm., VI 0.029 mm., VII 0.023 mm. Color of antenna grayish brown, first, second and third segments slightly tinged with crimson, first and base of second very light gray. First segment short cylindrical, second barrel-shaped, third sub-conical, fourth, fifth and sixth also sub-conical but more abruptly so, seventh short, tapering, bluntly pointed.

Descriptions of egg and larvæ made from a large number of specimens collected by the author on the bark of a dying coast live oak, Berkeley, California, September 3, 1930.

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BUTTERFLIES OF YAMHILL COUNTY, OREGON

BY KENNETH FENDER
McMinnville, Oregon

Yamhill County is in the northwestern portion of the State of Oregon, just south and west of Portland. It has proved a very fair collecting area for rhopalocera and I thought a list of the captures over a recent period would be of interest. Some ninety names are herein recorded, including two newer names from recent descriptions.

I wish to thank Mr. Robert Rieder and Mr. Ralph Macy, two local collectors, for their help. Without their notes this list would be very incomplete.

I have adopted Mr. J. D. Gunder's style of cataloguing from his "List of Butterflies of Los Angeles County, Calif." (Bulletin So. Calif. Acad. Sci., XXIX, August, 1930), and believe his use of classification categories, including the use of transition form in place of the word aberration, to be very satisfactory. His list quotes original description references, illustration notices and food plant data, so this information would, I believe, be superfluous if repeated here.

As this list probably is incomplete, I will record new captures as they occur, making note of them in future issues of the PAN-PACIFIC ENTOMOLOGIST.

1. PAPILIO BAIRDII OREGONIA Edw., a race (or form?). 1 ♂, no date, Carlton. Only specimen thus far reported from this county.

2. PAPILIO ZELICAON Luc., a species. 1 ♂, 1 ♀, May 18, 1930, Baker Creek Canyon; 1 ♂, April 27, 1928, McMinnville 1 ♀, May 6, 1928, McMinnville. Well distributed, but seemingly uncommon.

3. PAPILIO INDRA Reak., a species. Although this is an *indra* territory, I cannot report its capture from this county, but undoubtedly it is here, as it has been seen.

4. PAPILIO RUTULUS Luc., a species. 5 ♂, 3 ♀, April 16, 1928, Baker Creek Canyon; 1 ♂, 1 ♀, May 23, 1928, Muddy Valley; 9 ♂, 3 ♀, July 24, 1930. Common everywhere in the county and an easy capture.

5. PAPILIO EURYMEDON Luc., a species. 10 ♂, 3 ♀, June 16, 1930, Baker Creek Valley; 3 ♂, May 9, 1930, Muddy Valley; 9 ♂, 1 ♀, June 6, 1929, Baker Creek Valley. A common *Papilio*, taken at all elevations.

6. PAPILIO EURYMEDON ALBANUS F. & F., a form. 1 ♂, June 6, 1928, mountains above Baker Creek. A seemingly rare form of this species.

7. PARNASSIUS CLODIUS CLAUDIANUS Stich., a race. 50 ♂, 10 ♀, June 25, 1930, and 20 ♂, 7 ♀, June 30, 1930, Baker Creek Canyon. Very common in this particular canyon where on favorable days it fairly seems to swarm.

8. PARNASSIUS CLODIUS BALDUR Edw., a form? 2 ♂, 3 ♀, August 8, 1928, 1 ♂, July 12, 1930, and 1 ♂, July 16, 1930, Baker Creek Canyon. Not very plentiful.

9. NEOPHASIA MENAPIA F. & F., a species. 1 ♂, 1 ♀, July 27, 1930, 12 ♂, 2 ♀, August 6, 1930, 7 ♂, 4 ♀, August 12, 1929, Baker Creek Canyon; 1 ♂, July 27, 1929, Pea Vine Ridge, Females difficult to capture, as they fly high.

10. ASCIA PROTODICE Bdv. & Lec., a species. 1 ♀, August 23, 1930, McMinnville; 1 ♀, unknown date, Bellview. Probably a visitor from eastern Oregon.

11. ASCIA PROTODICE VERNALIS Edw. 1 ♀, August 27, 1930, Bellview. Also a stray.

12. ASCIA NAPI OLERACEA Harr., a form? This butterfly is seen on the western boundary of the county.

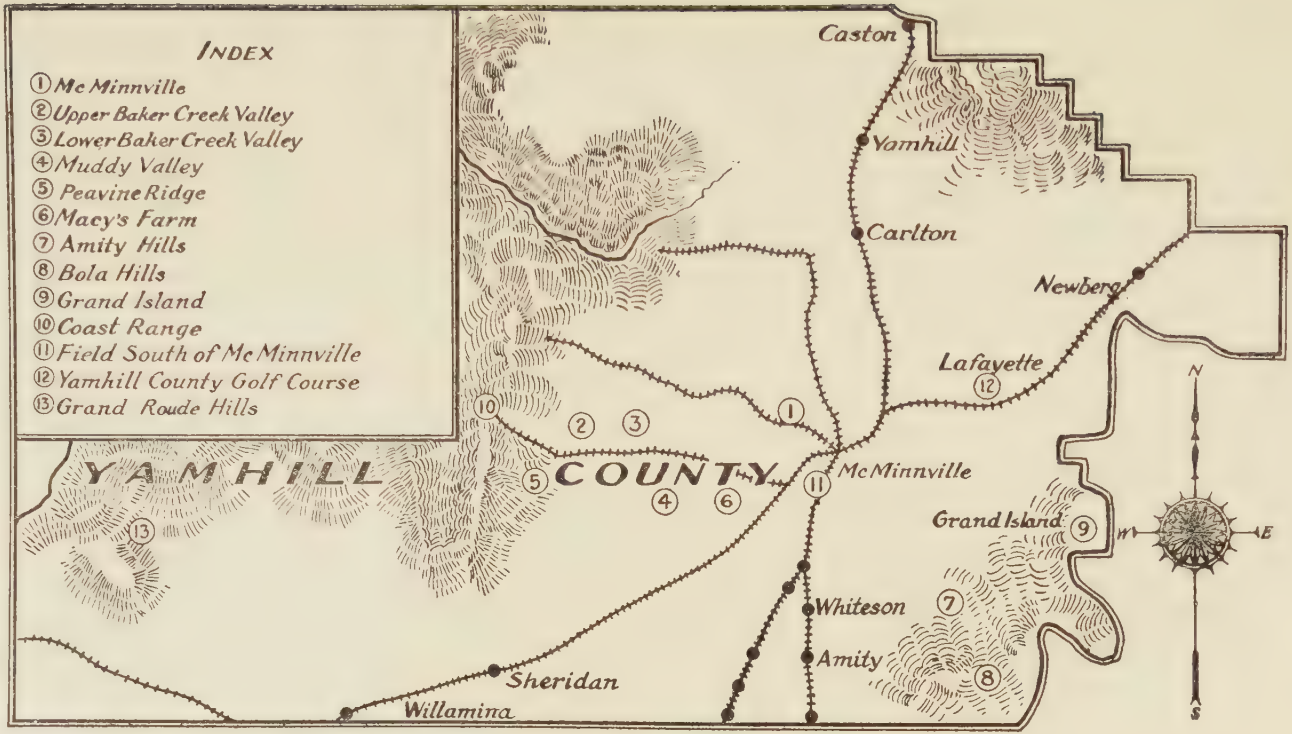
13. ASCIA NAPI CASTORIA Reak., a seasonal form? 1 ♀, August 27, 1930, Bellview. Seldom taken in this county.

14. ASCIA NAPI MARGINALIS Scud., a seasonal form? 3 ♂, April 20, and 20 ♂ ♀s, May 3, 1930, Baker Creek Canyon. Rather common at proper time.

15. ASCIA NAPI PALLIDA Scud., a seasonal form? 3 ♂, 2 ♀, June 18, 1928, 5 ♂, June 30, 1929, 2 ♂, 1 ♀, June 6, 1930, Baker Creek Canyon. A fragile butterfly hard to secure in good condition. Females seem to be scarce.

16. ASCIA RAPÆ L., a species. 12 ♂, 9 ♀, May 12, 1927. McMinnville. Common everywhere as usual.

17. ASCIA RAPÆ YREKA Reak., a form. 2 ♂, 1 ♀, July 29, 1930, McMinnville. A darker form of the species, especially dark on the under side.



MAP of COLLECTING GROUNDS in YAMHILL COUNTY, OREGON.-Fender

18. ANTHOCHARIS SARA REAKIRTI Edw., a race. 12 ♂, April 10, 1929, 6 ♂, May 16, 1930, Baker Creek Canyon. A common butterfly. White females not seen.

19. ANTHOCHARIS SARA REAKIRTI STELLA Edw., a female form. 3 ♀, April 16, 1927, Baker Creek Canyon; 5 ♀, April 29, 1929, hills north of Bellview; 4 ♀, May 13, 1930, Baker Creek Canyon. Certainly a female form of the species in this locality.

20. ANTHOCHARIS SARA JULIA Edw., a race here? 1 ♂, May 16, 1930, Baker Creek Canyon; 1 ♂, May 27, 1930, Pea Vine Ridge. Identification uncertain but probable.

21. EURYMUS EURYTHEME Bdv., a species. 1 ♀, October 12, 1929, McMinnville. Not common.

22. EURYMUS EURYTHEME AUTUMNALIS Ckll., a seasonal form (?). 1 ♂, May, 1927, Bellview; 1 ♀, October 19, 1928, McMinnville. Divergent emergence may account for the above records.

23. EURYMUS EURYTHEME AMPHIDUSA Bdv., may be a species here. 2 ♂, 5 ♀, August 6, 1927, south of McMinnville; 1 ♂, 1 ♀, September 6, 1927, golf course near McMinnville; 5 ♂, 2 ♀, September 6, 1929, near McMinnville. What I take to be this butterfly is quite common in the county.

24. EURYMUS EURYTHEME AMPHIDUSA ALBA Stkr., a female form. 2 ♀, August 16, 1928, Muddy Valley; 1 ♀, October 12, 1930, McMinnville. White females occur continually.

25. EURYMUS OCCIDENTALIS CHRYSOMELAS SHASTÆ B. and Benj., a female form. 1 ♀, date unknown, Bellview. The white female of *chrysomelas* and rare.

26. DANAUS MENIPPE Hbn., a species. 2 ♂, June 6, 1927, McMinnville; 1 ♂, August 7, 1930, Baker Creek Valley. Quite scarce in this county because of absence of the food plant, which is milkweed.

27. CŒNONYMPHA CALIFORNIA ERYNGII Hy. Edw., a race. 1 ♂, July 7, 1928, and 1 ♂, July 23, 1930, McMinnville. Has more yellow on than the species.

28. CŒNONYMPHA AMPELOS Edw., a species. 100 ♂ ♀, 1927, 25 ♂ ♀, July 19, 1929, McMinnville. A very common butterfly.

29. CERCYONIS ARIANE Bdv., a species. 40 ♂ ♀, June 12, 1930; 20 ♂, 60 ♀, June 19, 1930, Pratt's Farm. The only Satyr in the county thus far.

30. ARGYNNIS LETO Behr, a species. 3 ♂, 2 ♀, July 9, 1929, 10 ♂, July 12, 1930, 25 ♂, 1 ♀, July 15, 1930, Baker Creek Valley. Most plentiful *Argynnis* in this section; but females are difficult to secure.

31. ARGYNNIS BREMNERII Edw., a species. 6 ♂ ♀, July 14, 1929, 12 ♂ ♀, July 12, 1930, Baker Creek Valley. Common in locality noted.

32. ARGYNNIS HYDASPE RHODOPE Edw., a race. 2 ♂, 1 ♀, July 12, 1930, 1 ♂, July 16, 1930, Baker Creek Valley. Not plentiful.

33. ARGYNNIS CLIO Edw. (?) 1 ♂, June 9, 1928, Muddy Valley. I hesitate to try to identify this specimen until Mr. Gunder's revision of the genus appears.

34. BRENTHIS EPITHORE Edw., a species. 25 ♂, 7 ♀, May 17, 1930, 16 ♂, 3 ♀, June 4, 1930, Baker Creek Valley. Common from May till late July.

35. EUPHYDRYAS CHALCEDONA D. and H., a species. 2 ♂, May 26, 1930, Baker Creek Valley; 1 ♀, May 23, 1928, Lower Baker Creek. Seldom found in this district.

36. EUPHYDRYAS CHALCEDONA COLON Edw. (?), a race. 1 ♂, May 30, 1929, Baker Creek Valley; 2 ♂, June 4, 1930, Lower Baker Creek Valley. More local exploration is needed to determine these specimens with certainty.

37. PHYCIODES CAMPESTRIS Behr., a species. 5 ♂, 3 ♀, May 16, 1928, Muddy Valley; 3 ♂, August 6, 1930, Baker Creek Valley. Common in May and June.

38. PHYCIODES MYLITTA Edw., a species. 12 ♂, May 8, 1930, Baker Creek Valley; 1 ♂, 1 ♀, July 16, 1930, McMinnville. Plentiful throughout the county.

39. PHYCIODES MYLITTA MACYI Fender., a transition form. 1 ♂, September 6, 1929, Pea Vine Ridge. (Ent. News, June, 1930). Albifusism.

40. PHYCIODES MYLITTA COLLINSI Gund., a transition form. 1 ♂, July 4, 1929, McMinnville. Immaculism.

41. POLYGONIA SATYRUS Edw., a species. 7 ♂ ♀, April 25, 1928, 15 ♂ ♀, May 9, 1929, McMinnville; 6 ♂, 1 ♀, July 16,

1930, Baker Creek Valley. Common enough in the valleys at the forest edge.

42. POLYGONIA SATYRUS CHRYSOPTERA Wrgt., a form. 1 ♂, 2 ♀, undated, McMinnville. A lightly colored form of this species.

43. POLYGONIA SATYRUS MARSYAS Edw., a race (?). 2 ♂, April 25, 1928, 2 ♂, 1 ♀, April 27, 1928, McMinnville. A scarce Satyr.

44. POLYGONIA FAUNUS RUSTICUS Edw., a race. 15 ♂ ♀, April 12, 1930, 5 ♂ ♀, May 4, 1930, Baker Creek Valley. Many can be captured in the valleys of the foothills.

45. POLYGONIA OREAS Edw., a species. 1 ♂, April 27, 1930, Baker Creek Valley. This is the only record thus far.

46. POLYGONIA OREAS SILENUS Edw., a race. 3 ♂, 1 ♀, May 20, 1928, 2 ♂, May 29, 1929, Muddy Valley; 1 ♂, 2 ♀, April 12, 1930, Baker Creek Valley. Considered a rare butterfly and a high flier.

47. AGLAIS CALIFORNICA Bdv., a species. 1 ♂, May 16, 1929, Baker Creek Valley; also 1 ♂ taken near McMinnville. Strangely rare in this collecting area.

48. AGLAIS MILBERTI Godt., a species. 1 ♂, June 7, 1928, McMinnville. Rare here.

49. AGLAIS MILBERTI SUBPALLIDA Ckll., a form. 1 ♂, July 12, 1929, Yamhill County golf course; 2 ♂, June 16, 1930, Baker Creek Valley. This form is evidently commoner than the species itself. Much intergradation.

50. AGLAIS ANTIOPA L., a species. 4 ♂, 1 ♀, April 8, 1930, 1 ♂, July 16, 1929, Baker Creek Valley. This species seems to be with us the year round.

51. CYNTHIA ATALANTA L., a species. 2 ♂, May 12, 1928, 3 ♂ (bred), June 14, 1929, McMinnville. Found most everywhere.

52. CYNTHIA VIRGINIENSIS Dru., a species. 1 ♂, May 24, 1929, McMinnville. Not at all common here.

53. CYNTHIA CARDUI L., a species. 1 ♂, May 16, 1928, 1 ♂, May 24, 1930, Muddy Valley. Scarcely ever taken in the county, but may be plentiful at times.

54. CYNTHIA CARYE Hbn., a species. 4 ♂ ♀, April 25, 1928, 6 ♂ ♀, April 27, 1928, McMinnville. Common in comparison

to *cardui*. This species likes to play along the edges of the woods with the *Grapta* species.

55. CYNTHIA CARYE MUELLERI Letch., a transition form. 1 ♂, July 23, 1930, Macy's Farm. This specimen was picked off the front of an auto.

56. BASILARCHIA WEIDEMEYERII Edw., a species. 1 ♂, undated, foothills south of McMinnville. Probably a visitor in this region.

57. BASILARCHIA LORQUINI Bdv., a species. 5 ♂, July 24, 1930, Baker Creek Valley; 2 ♂, 1 ♀, May 9, 1928, Muddy Valley. Our commonest Admiral.

58. BASILARCHIA LORQUINI EAVESII Edw., a form. 1 ♀, August 6, 1930, McMinnville. A form in which a row of spots appear on the upper side of secondaries.

59. BASILARCHIA LORQUINI BURRISONI Mayn., a race (?). 10 ♂, 3 ♀, May 24, 1930, Baker Creek Valley. There is evidently a local colony of this up Baker Creek.

60. HETEROCHROA BREDOWII CALIFORNICA Butl., a race. 1 ♂, July 29, 1928, McMinnville; 2 ♂, 1 ♀, August 6, 1930, Baker Creek Valley. Quite rarely found.

61. ATLIDES HALESUS Cram., a species. 1 ♂, 1 ♀, undated, Macy's Farm near McMinnville. Considered a very lucky catch in this region.

62. STRYMON MELINUS Hbn., a species. In local collections, evidently from this district.

63. STRYMON SYLVINUS Bdv., a species. 9 ♂ ♀, May 18, 1930, 6 ♂ ♀, June 14, 1929, Baker Creek Valley. Taken often in foothills and higher levels.

64. INCISALIA IROIDES Bdv., a species. 1 ♂, July 12, 1930, 1 ♀, July 16, 1930, Baker Creek Valley. Last year I was glad to find this butterfly for the first time.

65. INCISALIA ERYPHON Bdy., a species. 1 ♂, July 26, 1930, Baker Creek Canyon. Probably more records of this species will be available later.

66. CALLOPHRYS DUMETORUM Bdv., a species. 2 ♂, June 8, 1930, 1 ♂, June 27, 1930, Valley of Baker Creek. Probably common enough if searched for.

67. THARSALEA VIRGINIENSIS Edw., a species. 3 ♂, 2 ♀, June 18, and 2 ♂, 1 ♀, June 27, 1929, Lower Baker Creek

Valley. A small local habitat of this species has thus far been the only colony found in this region.

68. LYCÆNA XANTHOIDES Bdv., a species. 1 ♂, 1 ♀, June 18, 1928, 1 ♂, June 27, 1928, Macy's Farm near McMinnville. The northern limit of this species evidently just reaches this county.

69. LYCÆNA HELLOIDES Bdv., a species. 3 ♂, 3 ♀, June 8, 1928, 7 ♂, 3 ♀, June 21, 1929, McMinnville; 2 ♂, 4 ♀, July 12, 1930, Baker Creek Canyon. This pretty little copper is our commonest butterfly in the genus.

70. EVERES AMYNTULA Bdv., a species. 4 ♂, 2 ♀, April 8, 1929, 2 ♂, 2 ♀, May 18, 1930, Baker Creek Valley and Canyon. Fairly plentiful.

71. PLEBEIUS MELISSA Edw., a species. 1 ♂, June 7, 1930, fields south of McMinnville. Probably only a chance record, though there may be a numerous colony.

72. PLEBEIUS MARICOPA FENDERI Macy, a race. 1 ♂, 2 ♀, May 25, 1929, taken on an isolated patch of lupine just west of Macy's Farm. (Ent. News, January, 1931).

73. PLEBEIUS ACMON D. and H., a species. 6 ♂, 2 ♀, May 18, 1929, Redmond's rock crusher; 10 ♂, 6 ♀, June 11, 1927, Grand Island. Common enough most everywhere.

74. PLEBEIUS ACMON COTTLEI Grin., a seasonal form. 1 ♂, 1 ♀, April 12, 1928, at same locality as species. Has darker underside. Is an interesting catch.

75. PHILOTES BATTOIDES OREGONENSIS B. and McD., a race. 1 ♂, July 27, 1927, Muddy Valley. Only record thus far.

76. GLAUCOPSYCHE XERCES POLYPHEMUS Bdv., a race (?). 4 ♂, 3 ♀, May 16, 1930, 2 ♂, 1 ♀, June 7, 1930, Baker Creek Valley. The synonymy of Barnes and Benjamin check list is difficult to understand in this group.

77. GLAUCOPSYCHE XERCES ANTIACIS Bdv., a form or race (?). 1 ♂, 2 ♀, May 19, 1928, McMinnville. As in No. 76, this group is difficult to identify.

78. LYCÆNOPSIS PSEUDARGIOLUS B. and L. (form or race of, ?). 12 ♂, 5 ♀, May 27, 1930, Baker Creek Valley. Quite common.

79. LYCÆNOPSIS PSEUDARGIOLUS NEGLECTA Edw., a seasonal form. 1 ♂, June 26, 1930, Baker Creek Valley. Scarcer than the species.

80. EPARGYREUS TITYRUS Fabr., a species. 3 ♂, July 12, 1927, Baker Creek Valley; 10 ♂, 8 ♀, July 24, 1930, Baker Creek Valley. Many to be taken in the foothills.

81. PYRGUS RURALIS Bdv., a species. 2 ♂, 2 ♀, July 7, 1927, 1 ♂, 3 ♀, July 12, 1929, Baker Creek Valley. This one locality is the only spot thus far found here for this butterfly.

82. PYRGUS TESSELLATA OCCIDENTALIS Skin., a race. 1 ♂, 1 ♀, July 18, 1928, McMinnville; 1 ♂, June 11, 1927, Grand Island. Not numerous, but probably taken throughout this county.

83. PYRGUS SCRIPTURA Bdv., a species. 1 ♂, July 16, 1928, Baker Creek Valley. Rare here as it evidently is most everywhere.

84. ERYNNIS PERSIUS AFRANIUS Lint. (?), a race. 2 ♂, June 8, 1929, Muddy Valley; 2 ♂, 1 ♀, July 24, 1930, Baker Creek Valley. A relatively common skipper.

85. ERYNNIS PROPERTIUS S. and B., a species. 6 ♂, 3 ♀, May 12, 1926, Muddy Valley; 3 ♂, 3 ♀, May 4, 1928, Baker Creek Valley; 6 ♂, 4 ♀, May 28, 1929, Eola Hills. A very plentiful hill skipper.

86. PAMPHILIDA PALÆMON Pall., a species. 2 ♂, July 19, 1930, Baker Creek Valley. Uncommon skipper here as it is elsewhere in the West.

87. POLITES SONORA Scud., a species. 1 ♂, July 12, 1929, McMinnville. A scarce capture in these parts.

88. POLITES MARDON Edw., a species. 1 ♂, June 28, 1929, McMinnville; 1 ♀, June 10, 1930, Baker Creek Canyon. A rare butterfly.

89. POLITES SABULETI Bdv., a species. 20 ♂, 9 ♀, August 6, 1929; 45 ♂ ♀, August 21, 1930, McMinnville. This skipper swarms in quantity in the valleys during August.

90. ATRYTONE VESTRIS Bdv., a species. 3 ♂, July 13, 1928, 2 ♂, 1 ♀, July 24, 1929, Baker Creek Valley. Quite common in collections.

A NEW BRACHYTARSUS FROM CALIFORNIA

(Coleoptera—Platystomidæ)

BY R. E. BARRETT

Saticoy, California

Brachytarsus franseria Barrett, n. sp.

Oval, robust, less than twice as long as wide, brown, thickly clothed with short, dark brown and yellow pubescence. Head piceous with sparse yellow pubescence; beak with sides slightly oblique, tip of mandibles castaneous; eyes emarginate; antennal grooves reaching the eyes; antennæ inserted on the sides of the beak; segments 1 and 2 robust, the second slightly longer and noticeably broader; segments 3 to 8 shorter and more slender; segments 9 to 11 forming an oval and very slightly compressed club; segments 1 to 9 castaneous; club piceous. Thorax as wide at base as long; basal carina strongly arcuate, reflexed at hind angles when viewed from above, scarcely extending along the sides. Elytral striæ evenly spaced and parallel, tessellated on alternate intervals. Body beneath finely pubescent; legs with femur piceous, tibia and tarsus castaneous, claws minutely cleft. Length, 2.0 to 2.5 mm.; breadth, 1.0 to 1.3 mm.

Holotype, No. 3005, in the Museum of the California Academy of Sciences. Numerous paratypes in my own collection. All specimens were taken by me on ragweed, *Franseria bipinnatifida* Nutt., growing on the sand hills at Hueneme, Ventura County, California. A series of specimens were first collected July 18, 1926, and another series on April 16, 1931. Considerable variation is shown in the series at hand. The April specimens are darker and the elytra lack much of the tessellated appearance. Four specimens collected in April have the tibia and tarsus piceous.

This species should be placed near *alternatus* in our lists, from which it may be readily separated by the color of the legs.

The numbers of Volume VII of the PAN-PACIFIC ENTOMOLOGIST were mailed on the following dates: No. 1, on September 26, 1930; No. 2, on December 12, 1930; No. 3, on April 7, 1931; No. 4, on June 2, 1931.

ON THREE NEW CHILOPODS

BY RALPH V. CHAMBERLIN
University of Utah

The three new Chilopods described below were represented in collections taken at quarantine by United States inspectors at Honolulu and New Orleans, as indicated, and sent to the author for determination. The types of the new forms are in the author's collection.

CRYPTOPIDÆ

Cryptops vector Chamberlin, sp. nov.

General color yellow, with anal legs and especially the antennæ orange.

Cephalic plate smooth, wholly lacking the longitudinal sulci; overlapping the first dorsal plate. Antennæ composed of seventeen very short articles of which the first five or six bear longer hairs. First tergite with paired longitudinal sulci which meet anteriorly, in a depression, a median angulation in the free transverse sulcus. Second tergite with complete paired sulci. Succeeding tergites also with paired sulci, but with no indication of keels. Prosternal margin straight or slightly concave from end to end, without median emargination. Last ventral plate short, strongly narrowed caudad; the caudal margin rather wide, scarcely convex, the posterior corners rounded. Coxopleura caudally truncate; bearing short spinescent setæ caudally and laterally; pores small and few in number, far from reaching the caudal margin or dorsal plate.

Femur of anal legs bearing numerous spines ventrally, laterally, and dorsally, with a few ordinary setæ above, especially toward distal end; dorsally with a median longitudinal furrow which is deeper at caudal end; without teeth. Tibia with ventral and misal surfaces bearing numerous spines, leaving no clear area, the ectal and dorsal surfaces bearing ordinary setæ; a single tooth near caudal end beneath; a median longitudinal sulcus at caudal end above. Metatarsus with a series of four teeth beneath. First tarsal joint with two teeth beneath. Tarsi of all legs, excepting the last two pairs, wholly undivided.

Length, about 16 mm.

Locality: One specimen taken at New Orleans, Louisiana, on banana débris from Honduras, July 1, 1930.

This species seems to have nearest affinities with *C. hyalinus* Say and *C. detectus* Silvestri. From the first it may be readily separated by the absence of a median keel on tergites, the presence of a dorsal longitudinal furrow on femur and tibia

of anal legs, and the presence of a single tooth on tibia beneath. From *detectus* it differs in having four ventral teeth on the first tarsal joint instead of only two, etc.

LITHOBIIDÆ

Tidabius vector Chamberlin, sp. nov.

Dorsally yellowish brown in color, with head and distal ends of antennæ and lights a brighter, somewhat lemon-yellow, color.

Antennæ short, composed of twenty-six, mostly very short, articles. Eye patch linear, composed of about eight ocelli in two series, *e. g.*, 1 + 4, 3. Prosternal teeth uniform, 2 + 2. Coxal pores, small, round, 3, 3, 3, 3.

Ventral spines of first legs, 0, 0, 0, 0, 1. Penult legs with two claws; ventral spines, 0, 1, 3, 3, 1; dorsal spines, 0, 0, 3, 1, 0. Anal legs with two claws; ventral spines, 0, 1, 3, 2, 0; dorsal spines, 0, 0, 2, 0, 0. None of coxæ armed.

Posterior legs of male simply inflated, with no special lobes.

Length, approximately 7 mm.

Locality: One male (holotype) taken at Honolulu, Hawaii, July 17, 1930, in packing about orchids from Mexico.

Among species of the genus having the ventral spines of the anal legs, 0, 1, 3, 2, 0, and the dorsal spines of the penult legs, 0, 0, 3, 1, 0, agreeing with *nasintus* Chamberlin and *suitus* Chamberlin in bearing only two claws on the anal leg. From these two species it seems to differ in smaller number of antennal articles (26 as against 29-32), somewhat fewer ocelli, and in having the coxal pores 3, 3, 3, 3 instead of uniformly 2, 3, 3, 3.

ETHOPOLIDÆ

Bothropolys (Synopolys, subgen. nov.) **epelus** Chamberlin, sp. nov.

Dorsum brown, the cephalic plate and antennæ somewhat chestnut; legs yellowish, more brightly pigmented distally.

Antennæ of moderate length, composed of the usual two articles. Ocelli numerous, typically in four series in which the ocelli decrease in size cephalad and ventrad, *e. g.*, 1 + 6, 6, 4, 3. Prosternal teeth small, black, uniform, in the holotype 6 + 6. Dorsal plates strongly and irregularly subrugose. Posterior angles of seventh, ninth, eleventh, and thirteenth dorsal plates produced, the angles of the seventh plate less strongly but nevertheless distinctly produced.

Ventral spines of first legs, 0, 0, 2, 3, 2. Ventral spines of the penult legs, 1, 1, 3, 2, 1; dorsal spines, 1, 0, 3, 1, 1; claw single. Axial legs many. Last two pairs of coxæ armed ventrally, laterally, and

dorsally; the two preceding poriferous, coxæ not armed ventrally.

Claw of female genital forceps tripartite, the lateral lobes small. Basal spines slender, 3 + 3.

Length, near 15 mm.

Locality: One female, the holotype, was taken on the dock at New Orleans, September 2, 1930.

This species, which may have escaped from a ship at the dock, has its nearest known relations among the North American species of the genus. With these it agrees in the general characters of head, prosternum, antennæ, etc. It differs from all of them in having the angles of the seventh tergite produced while those of the sixth are not, and in having the basal spines of the female gonopods 3 + 3 instead of 2 + 2. These two characters are the basis of its subgeneric distinction from *Poropolys,* in which neither the sixth nor the seventh dorsal plates have their angles produced; and from *Bothropolys* sens. str. in which only the ninth, eleventh, and thirteenth dorsal plates have their angles produced.

A New Pest of the Avocado in California

Caulophilus latinasus (Say) was found by the writer feeding in the seeds of avocado in Orange County (April 12, 1931). Adults and larvæ of all sizes were found in the seeds, which were completely riddled. This weevil has been known in the Southern States since 1831, but record of its occurrence in the West is lacking. It is listed as also occurring in the West Indies, Mexico, and Guatemala. Other known hosts are chick-peas and Indian corn.—R. E. Barrett.

Macrosargus cuprarius Linn. in California

On May 24, 1930, I noted many larvæ of this Stratiomyid in dry cow manure near Orangevale, Sacramento County. A number of the slender, metallic bluish-green adults emerged during June. Dr. J. M. Aldrich writes concerning this species that it is of European origin, first reported in this country from the vicinity of Philadelphia in 1896. It was known in Wisconsin in 1913 and throughout Canada by 1927. The species was determined by C. T. Green.—H. H. Keifer, Sacramento.

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In the April 3, 1931, number of *Science* Dr. Stiles expresses much concern regarding the future of the international code of zoölogical nomenclature, basing his unfavorable prognosis upon the action of the Padua (1930) meeting of the International Zoölogical Congress in amending the international rules in the open meeting of the Congress without such amendment having been acted upon by the International Committee on Zoölogical Nomenclature. There can be no question but the work of the International Committee has been of inestimable value to zoölogy through stabilization of its nomenclature, and it is most earnestly to be hoped that no permanent rift will rob these efforts of their international character. Probably all active working entomologists follow these rules rigidly or endeavor to do so. The so-called "Opinions" are really but personal interpretations of the rules and there is not yet the same unanimity in their observance. Some of these "Opinions" were adopted by the committee without the unanimous agreement required in the case of the rules and probably will be reconsidered later.

Among entomologists at least there is still some divergence of opinion as to what constitutes the valid naming of a genotype. Apparently Fabricius was the first to indicate genotypes, which he first attempted in 1794 by repeating, in certain genera, the generic diagnosis in his description of the species he intended should be taken as the type of the genus. Lamarck in 1801 undoubtedly was the first to designate types for each genus of which he treats, and these type fixations are accepted by many of our entomologists despite the fact that the International Committee ruled in Opinion 79 that this work could not be considered as fixing genotypes. This and other inconsistencies found in these "Opinions" will, without doubt, be eliminated in time, but in any case they do not affect the validity and great value of the international rules which should be, and probably are, accepted by all workers in systematic zoölogy, in this country at least. The foundation is satisfactory to all; the superstructure only needs repairs in certain places.—E. P. Van Duzee.

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